OCT 30 1928

THE JOURNAL OF PHILOSOPHY

PERIODICAL ROOM
GENERAL LIBRARY
UNIV. OF MICH.

VOL. XXV. NO. 22: OCTOBER 25, 1928

CONTENTS

The Scientific View of Life: RALPH S. LILLIE 589

Book Reviews:

Wickham's The Misbehaviorists: HAROLD A. LARRABEE 607

Steele's Opera hactenus inedita Rogeri Baconi, Fasc. VI and VII: RICHARD MCKEON 609

Saunder's The Gospel for Asia: WILLIAM H. ROBERTS 612

Nicholson's Some Aspects of the Philosophy of L. T. Hobhouse: PAUL W. WARD 614

Journals and New Books 615

Notes and New 616

PUBLISHED FORTNIGHTLY
BY THE
JOURNAL OF PHILOSOPHY, INC.

THE JOURNAL OF PHILOSOPHY

All communications to the Editors should be addressed to Professor FREDERICK J. E. WOODBRIDGE, or Professor WENDELL T. BUSH, or Professor HERBERT W. SCHNEIDER, Columbia University, New York.

Subscriptions and advertisements should be sent to THE JOURNAL OF PHILOSOPHY, 515 West 116th Street, New York. The annual subscription price (twenty-six numbers) is $4.00 and the charge for single numbers is 20 cents. Advertising rates will be forwarded on application.

THE JOURNAL OF PHILOSOPHY is owned by The Journal of Philosophy, Inc., 515 West 116th Street, New York, and published at Lancaster, Pa.: President, Wendell T. Bush; Vice-President, Herbert W. Schneider; Treasurer, Frederick J. E. Woodbridge; Secretary, Iris W. Wilder.

Entered as second class matter, March 18, 1921, at the Post Office at Lancaster, Pa., under Act of Congress of March 3, 1879.

Kant's Inaugural Dissertation and Early Writings on Space

Translated by

JOHN HANDYSIDE

M.A. (Edin.), B.A. (Oxon.); Late Lecturer in Philosophy in the University of Liverpool

CONTENTS

INTRODUCTION.....By Norman Kemp Smith, *University of Edinburgh*

TRANSLATIONS

1. Thoughts on the True Estimation of Living Forces (Selected Passages).
2. On the First Ground of the Distinction of Regions in Space.
3. Dissertation on the Form and Principles of the Sensible and Intelligible World.

PRICE $2.00

THE OPEN COURT PUBLISHING COMPANY

CHICAGO
337 East Chicago Avenue

NEW YORK
31–33 East Tenth Street

VOL. XXV, No. 22. OCTOBER 25, 1928

THE JOURNAL OF PHILOSOPHY

THE SCIENTIFIC VIEW OF LIFE[1]

THE problem may be put briefly as follows: how far is life, the peculiar development in nature that we call vital, so sharply distinguished from the non-vital, amenable to scientific treatment?

This problem at once raises the question of the nature and applicability of scientific method in general. On the one hand we have those who deny that science portrays reality truthfully, who hold that a certain element of falsification is implicit in scientific procedure, that the very rigor of its formulations deprives them of contact with a reality which is essentially fluid and expansive in its character. This is the kind of criticism brought forward with much force and acuteness by Bergson and other French critics of scientific method. On the other hand, the continued advance of science and particularly the success of its application to the problems of the physical world show unquestionably that it has a true correspondence with at least a large section of reality. Mathematics and nature fit one another too closely to admit of doubt in this matter; mathematical physics is justly regarded as one of the chief triumphs of the human mind; and the biological sciences, with medicine, comprise an equally impressive body of verified knowledge. Apparently the natural world, both living and non-living, can be described, ordered, and controlled by science to a degree that admits of no limit. It is thus scarcely possible to deny the validity of science in its sphere; the question is rather as to its field and range of application. This question arises with particular urgency when we consider life in its aspects and implications other than the evidently physical.

Let us take first for consideration what is perhaps the most significant fact about living beings—a fact characteristically vital and at the same time physical—namely, individual development or ontogeny. Put briefly, the essential general fact is this. Each plant and animal comes into existence by a process of orderly and progressive transformation, starting with a portion of a parent organism. This portion is simpler in its structure and activities than the parent, as well as smaller; in protozoa it may consist of one-half of the original cell; in such a case the organism is said to reproduce by

[1] Paper read before the Philosophical Club, University of Chicago, April 11, 1928.

division. But since each half of the dividing cell gives rise eventually to a whole cell, similar in all respects to the original single cell, it is evident that the mere fact of division does not explain the reproduction; there must also be a process of growth and progressive complication leading to the restoration of the original organization, i.e., a reorganization. Life, as illustrated by ontogeny in its simplest form, thus appears as the creation of organization. Where the unicellular organism reproduces by a spore the case is not essentially different, although the spore may differ somewhat more obviously from the parent cell. In these cases the development appears relatively simple and occupies a brief time. The case appears somewhat different in multicellular plants or animals, e.g., when a seed gives rise to a tree, or an egg to a bird or human being, complete with its intricate structure and behavior; here the developmental process is complex and prolonged. It follows, however, a constant or stereotyped course, eventuating in an individual similar to that from which the detached portion or germ arose. The child resembles the parent at corresponding chronological stages, not only in physical but also in moral and intellectual characters. This resemblance we call "heredity"; heredity is shown in all cases of individual development, from bacteria to man. The essential reference of the term is to the fact of similarity or repetition in the developmental cycles (ontogenies) of the genetically connected individuals.

What is especially to be noted is that each ontogeny consists in a specific process of growth and orderly construction; it involves an accumulation from the surroundings and a far-reaching transformation of the materials and energy thus collected. This transformation occurs in a manner which is constant and characteristic ("specific") for each species of animal and plant. The life process thus appears as at the same time appropriative and transformative. We note that the material which is to be transformed is collected at a center (e.g., the germ) previously to its transformation; further, that the product of the succeeding transformation, the individual animal or plant, has a constant organization and activities; i.e., it conforms to a *type*. This analysis reduces the essential life process to one of centralization followed by specific synthesis. The synthetic transformation proceeds from within outwards; its precise course depends on the special physical and chemical constitution of the organizing center or germ. In other words, the "organization" of the latter determines the nature of the chemical and physical processes by which the new individual is synthesized. Hence from the same materials in the same environment each germ builds up a different product, as we see when we inoculate the same culture-medium with different microorganisms, or when we scatter a diversity of seeds in a garden or feed the same fodder to different animals.

From this brief description we see that the individual life has the general character of a developmental sequence or cycle, starting from relative simplicity and ending in relative complexity. In each individual of a species the sequence begins in the same way and passes through similar stages. The synthetic or creative character of vital activity shows itself most clearly in individual development, although evident in many other vital processes and, indeed, in metabolism itself. Transformation of the simple and diffuse into the complex and organized is the chief distinguishing characteristic of life. It is true that changes leading to synthesis or closer organization may occur elsewhere in nature in varying degrees, as incidents in the general course of evolution; but changes having a progressive and creative character in the sense just indicated are of the very essence of the vital process. We may add that to many persons the finalistic or apparently teleological aspect of the vital process is its most significant peculiarity. The term "emergence" is now often used to designate the origin of new and more complex qualities from simpler antecedents. What is particularly to be noted is that in life special features of organization, activity, and quality emerge which are not found elsewhere in nature; in the highest forms of life characteristics of unique individuality and value thus come into existence.

How can we conceive such a process scientifically? Can there be a science of individual development? How are we to account for the emergence of the special characters of the living from the simpler and more general characters of the non-living? What does this process imply with regard to the constitution of nature—and also of the reality behind nature?

Only a summary discussion of these questions is possible within the limits of this paper. At first it may conduce to clearness if I make a brief philosophical confession of faith. This is the faith of a realist. I know the ambiguity of the word and its shifting implications; and I define realism further as the doctrine that knowledge can and in certain cases does correspond in many essential particulars to the true or existential character of an independent reality. This reality may be identified with that which we perceive and otherwise experience as *nature*—the external world or cosmos. The realistic contention is that our mental representations or concepts of nature may be made a true, if partial, picture of the external actuality, i.e., of nature as it exists and acts independently of being known. A corollary is that the properties and activities of natural things remain the same whether they are known or not: in other words, their actual or intrinsic character is independent of their being formulated or conceptualized, i.e., of being mentally represented in images, words, or other symbols. Nevertheless, although their exist-

ence and activity are independent of the attitude of a knowing mind, realism maintains that there may be a true correspondence, especially a relational or quantitative correspondence, between the conception and the reality. In such a case the conceptual or symbolic representation is a true, even though partial, picture of the external reality, very much as a map is a true picture of a country. A true conception thus differs from a false one in having a definite correspondence with the independent reality. The correspondence, it should be emphasized, is partial, but is none the less real for that. Such a qualified realism seems unavoidable if we are to do justice to the obstinate and unequivocal character of external nature, as well as to our ability to deal effectively with it under the guidance of concepts. Scientific concepts are simply those whose validity has been put to the test; they have a certain constant and dependable character. This does not mean that they are of merely pragmatic value—that their validity consists in their special adjustment to the needs of the human animal; if they are valid they can, of course, be thus utilized, but fundamentally their applicability is of a broader kind and rests on their correspondence with certain real and permanent features of an independently existent reality.

We hold, then, that our scientific picture of nature corresponds (or may be made to correspond), so far as it extends, to an independently real nature. The prediction of eclipses and other predictions based on the observed and measured uniformity of nature offer the clearest testimony to the real existence of a natural order, which, although independent, may nevertheless be exactly known and formulated. The application of science to nature is a recognition of this uniformity or law-abiding characteristic, which is presupposed in all scientific analysis. The non-living part of nature is found experimentally to lend itself with remarkable completeness to such analysis. But the case of living beings has its special difficulties; and the problem arises of whether there are necessary and inherent limitations to the use of scientific method in this field. Two main questions may be asked here. First, does the application of scientific analysis to the case of living beings enable us to account for their general distinguishing peculiarities as natural systems of a special kind? And, second, can scientific analysis account similarly for the particular or individual characteristics of living beings, e.g., for those shown by a single human person? If it fails here, is the failure referable merely to the present insufficiency of our knowledge—as many scientific men believe—or to an inherent incapacity of the scientific method to deal with such problems?

Before considering these questions it will be necessary to review briefly the nature and implications of the scientific method itself.

First we may ask the general question just what are those special features of our experience, especially our experience of external nature, which make science possible? And since science has emerged somewhat gradually from an unscientific past, the further question arises of how scientific method originated and assumed its present characteristics.

In the introduction to Dr. George Sarton's monumental work on the History of Science he speaks of the advance of science as having depended largely on its emancipation from verbalism. He is here referring to the recognition, now well established in science, but reached only gradually in its history, that words are one thing, reality is another; that words, because of their vagueness in connotation, frequent ambiguity, and especially their tendency to form a world of their own, are inadequate and often misleading when used as symbols for an independent objective reality. Science has accordingly tended more and more to adopt special methods of description and representation, in which the deliberate aim is precision and unambiguity of meaning; its increasing dependence on quantitative and graphic methods is a part of this tendency. From this point of view it is clearly desirable that all disciplines concerned with the determination of truth, including philosophy, should experience a similar emancipation. Science has achieved it—or is in process of achieving it—by a systematic process of criticism and verification, and especially by the development of exact methods of observation and description. Emancipation from verbalism does not mean discarding the use of language in scientific description; this is scarcely possible except in parts of mathematics; even mathematics has many of the characteristics of language,—in fact is a language, as Willard Gibbs once remarked. What is essential is that we should be aware of what we are doing when we represent or symbolize our experience by verbal or other signs. The main requirement for any natural science is that it should fix its attention on the objective fact, as it is experienced, and avoid being misled by the accidental properties of the merely representative symbols; i.e., it should recognize the natural fact as primary and the representation as secondary, while doing everything possible to make the representation conform to the fact.

The general fact or condition which makes science possible is the observed presence of order, repetition, and interconnection in our experience, especially our experience of external nature. This condition appears to be one inherent in natural reality, both in external nature and in mind; it has priority over language; on its continued existence the evolution of language has been based. Nature presents itself to our apprehension—is "given"—as classifiable; i.e., as con-

stituted of elements, data, qualities, forms, sequences, frames of reference which are *repeated*. This repetitive feature is the fundamental natural characteristic which underlies the possibility of symbolic representation of any kind. Presumably language evolved as primitive man became by degrees consciously aware of this universal feature in his experience and connected his important recurrent feelings, acts, or situations with special vocal signs. It is a general human characteristic to give a name to any experience that recurs again and again, especially the experience of an external object; i.e., we signify its recognizable or constant features by a vocal sign or word. The sign is not the thing, but it facilitates our dealing with the thing; biologically, a particular word often acts as a stimulus which sets in motion a definite physiological process of adjustment. We may suppose that the primitive man's first classifications of objects were into useful and non-useful; and that the distinctions which he thus made between different animals, plants, articles of food, and other objects became more definite by association with vocal sounds. No doubt also he early distinguished the human species as different from other animals. The manner in which he reached his classifications is, however, immaterial for the present purpose, which is simply to emphasize that the perception of constant or repeated elements in experience was the primary fact from which the use of language arose. The repetitive characteristic of nature is the most evident manifestation of its innate regularity, which later came to be recognized and formulated in precise terms by science.

It is clear that this repetitive feature in the constitution of nature could never have been evaded or ignored by any organism engaged in the struggle for existence; and in fact we observe that all organisms show stereotyped forms of response answering to the stereotyped conditions of their lives. I might add that certain other general features of natural action, which we now recognize as having to do with the basic laws of energy, were also necessarily and unavoidably taken into account from the very first in the responses of organisms. Conformity of this kind is perhaps the most fundamental condition of survival. Thus a certain minimum of food is necessary for each animal, and this quantity bears a definite relation to the size, age, sex, work done, and temperature. The quantitative side of the relations between organism and environment appears most clearly in the energy-interchange; accordingly, the department of physiology dealing with this interchange has assumed, perhaps more than any other, the characteristics of an exact science.

Since nature is repetitive in its structure it is also classifiable. For the same reason it is measurable; repeated elements or char-

acteristics can be counted; the number of times a certain characteristic is repeated in a natural object can thus be determined. The characteristic which is enumerated may be purely spatio-temporal, as in measurement of dimensions or durations; or it may relate to general physical features such as mass or energy; or it may be some special complex feature or component, e.g., a cell in a living organism. In any case, numbers and measurability are to be referred ultimately to the same repetitive peculiarity of natural reality. Now the classifiable and measurable characteristics of nature make a peculiar appeal to the scientific mind. Such a mind delights in the recognition of order, repetition, definite interconnection. It finds repetitive features,[2] similarity of conditions and factors wherever it looks, in subjective as well as in objective experience. Whenever it finds that the repeated individuals or data under consideration are practically equivalent—so that for most purposes their individual differences can be disregarded— it forms a generalized or composite mental picture, diagram, or "concept" of the object considered, and applies a verbal identification-sign or name to the object. This procedure simplifies nature, largely because it facilitates effective action, as already indicated. Hence the scientific mind requires and invents clear-cut pictures, images, and diagrams of nature; it is a schematizing type of mind. This tendency, taken in measure, conduces to mental economy, precision, and effectiveness. It offers an interesting contrast to the artistic type of mind—although the two have their affinities—the latter being interested mainly in harmonious concreteness or individualization; accordingly, it is often repelled by the scientific tendency; for example, William Rossetti described his brother, Dante Gabriel, as "unscientific to the marrow." This antipathy may come from an intuitive feeling that scientific procedure is too selective, generalizing, and partial, and ignores certain fundamental features of reality, especially the unique quality or individuality of its single manifestations. It would seem that both mental tendencies correspond to deep-seated characteristics of nature. I refer to this contrast because of its intimate bearing on the general problem under consideration; later I shall discuss briefly its possible significance.

Science, however, has evolved and has transformed the modern world in the ways that we know. It is now highly organized and systematic, and tends to become more and more comprehensive in its purely intellectual formulations as well as in its practical control. There is a certain inevitability in this, resulting directly from the gen-

[2] I have emphasized repetition in the foregoing because it is a primary datum of experience. Repetition, however, presupposes persistence of the determining conditions and an ultimate stability in the constitution of nature.

eral character of scientific procedure. Science has reached its present status by a continued close and impartial scrutiny of the processes of nature combined with the use of simplifying concepts. This scrutiny discloses nature as consisting everywhere of elements and processes which are repeated. This feature becomes even more evident when the scrutiny is extended to the "small-scale" or microscopic processes. It is in this field especially that nature is found to lend itself to far-reaching simplification and quantitative representation. And the resulting scientific picture of nature, as built up or constituted by microscopic elements or processes which are alike (molecules, atoms, electrons) receives experimental confirmation from all sides. The modern electron theory represents the climax of this analysis. Accordingly, physics has reached the conception of the diversity of nature as depending on the varying combinations of elementary units which remain the same in character and mode of action throughout all natural transformations.

A characteristic feature of scientific procedure, to which I have just referred, is the simplifying or summarizing character of its descriptions; this feature has an intimate bearing on the question of the adequacy of science as a means of characterizing reality. Our usual experience is that when we examine closely any natural object or phenomenon we soon perceive in it a mass of detail too complex for mental representation. But we also observe that much of this detail is repetitive; it therefore lends itself to quantitative representation. We can count the number of times a character or component is present, and a simple number may then stand for the features dependent on the repeated presence or summation of that component. In this procedure the implication is that each repetition of a component carries with it all the qualities of that component, which may not itself be analyzed further. A number, in scientific description, may thus stand for qualities (or a combination of qualities) which in their real nature are only partially apprehended. Accordingly, a simple numerical statement frequently summarizes a complex situation, as when we state the number of persons in a community who are afflicted with smallpox; many special characters of the community can be inferred from this number. Or a number may stand for characters like weight, dimensions, temperature, or other physical properties whose units are simple and invariable and subject to direct summation. Thus any numerical statement is a simplification. But in many departments of science the applicability of such statements is limited; usually there is a special character belonging to the whole phenomenon considered, some property or quality not representable merely as the sum of its parts. As a rule this special or synthetic quality in a complex object is represented scientifically by a mental

image, diagram, or concept which is at the same time comprehensive and simplifying. Thus in representing the figure of the earth we consider it as a sphere, or by a closer approximation as an "oblate spheroid." The description is partial, i.e., abstract; we are representing the whole natural reality by a simplified picture, schema, or model. This example illustrates a general feature of scientific procedure. The use of models, diagrams, schemata, simplified representations of one kind or another, is universal; sometimes the models are conceptual merely, e.g., geometric or algebraic formulæ or graphs; in other cases they may reproduce spatial relations in considerable detail, as in maps; in others an actual physical working model is made which reproduces concretely the characters in which we are interested. But every model is a simplification; it disregards many of the real characters of the phenomenon which it represents. If its behavior corresponds in sufficient detail to that of the phenomenon, a theory of the latter is implied; we consider that we understand the phenomenon if we understand the working of the model.

These considerations apply to the scientific representation of life phenomena; what is usually required is the imagination or construction of some model that will reproduce in intelligible form the essential features of the phenomenon under consideration. Intelligibility is the essential criterion of the scientific view; it aims at making phenomena intellectually comprehensible. The problem of the biologist is to determine how far this can be done and how best to do it in the case of the vital processes.

Simplification is thus an essential feature of scientific method; we may, in fact, regard science as in large part valid simplification. This is substantially the same as valid schematization or conceptualization. In science the test for validity is always experiential; the scientific concept is a symbol of some reality regarded as existing independently in nature; usually, as just seen, it takes the form of a picture, schema, or model. Etymologically a concept denotes a taking together or summing up,—a unification; in the Kantian phrase, it is a product of the synthetic unity of apperception. But a concept is a mental entity. In what way can it correspond to a physical entity, which on the realistic contention has an existence of its own, independent of mental representation? Can a concept or combination of concepts—admittedly diagrams, summaries, or abstractions—give under any circumstances a true account of an independent non-mental reality?

This is the general problem of the theory of knowledge in its special application to scientific knowledge. I think we must agree as to the impossibility of forming any conceptual picture that will

correspond to the *total* reality of any physical fact or other natural entity. This is seen in the very fact that a large number of equally valid concepts can be used in characterizing such an entity; i.e., many true statements can be made regarding it: it exhibits many demonstrable properties, aspects, and activities. It is important to note with regard to the natural facts or data of ordinary experience that the nature of many concepts in general use—those on the validity of which we are all agreed—is decided for us by the physical structure of our sense organs and other bodily apparatus, this structure being in turn definitely related to our basic physiological needs. This fact in itself is evidence of the external or objective validity of many concepts, since our continued existence depends on their application. To use Santayana's phrase, we may live by animal faith, but it remains a fact that we do survive in the midst of a not too accommodating nature. Such validity does not in the least imply a complete correspondence between concept and reality; the degree of correspondence is merely that sufficient to ensure survival. The fact of biological survival may, however, be taken as an experimental proof that a correspondence which is partial may nevertheless be a true and valid one.

We conclude that while a complete conceptual representation of natural reality is not possible, certain concepts may and do correspond to the real nature of things; in other words, certain kinds of partial or simplifying representations are "true." This consideration leads to another point of fundamental interest. We find that as the spatio-temporal dimensions of a natural object become smaller and smaller, scientific analysis always shows a progressive restriction of the number of applicable and valid concepts. We have what Whitehead calls a "convergence to simplicity."[3] The concept of an electron, for example, does not seem to admit of alternatives; at this stage of physical subdivision distinctions of quality disappear and only simple uniform quantitative characters remain. The implication is that what we know as "qualities" in natural objects—features that differentiate one kind of object from another—are characters of synthesized wholes only. Electrons are all alike; each has a fixed quantitative character and nothing else. An essentially quantitative basis for natural reality is thus indicated; spatio-temporal relations and units of activity (electrons) appear as the primary elements of natural synthesis.

What do we mean or imply by quantitative characters? Science has always attached special importance to the quantitative aspects of nature. Indeed, to many scientific men science is essentially the

[3] *Cf.* Whitehead's exposition of the method of extensive abstraction in his *Concept of Nature.*

description of phenomena in quantitative (i.e., mathematical) terms. The reason for this preference has been partly indicated above. Basically, it seems to come from the recognition that although a complete and qualitative correspondence of our conceptions with natural reality is not possible, a quantitative correspondence *is* possible. This is because the repetitive characteristic of reality is a universal characteristic and applies equally to the mental and the physical. There may thus be a point-to-point correspondence of mental and physical with regard to the repeated conditions, entities, or occurrences in the two domains—i.e., with regard to their order, frequency, and interrelationship—even though a qualitative correspondence is impossible. One can see that a complete and qualitative correspondence would be an identity. Some kind of symbolic representation is necessitated by the general conditions of knowledge, and a quantitative symbolism seems the least subject to error. It has the further advantage of being non-committal with regard to the intrinsic or existential character of natural reality; science thus avoids coming to an issue with metaphysics.

Accordingly, an objective science seems forced to the conclusion that there can be no more than a quantitative correspondence between the symbolism used in scientific description and the objective reality described. But this correspondence may be detailed and exact. It includes an enumeration of repeated features or components, their structural or functional inter-relationships, and their disposition in that natural order which presents itself to our perception as the space-time order. The repetitive and orderly character common to both mental and physical realms makes it possible for the mental picture to correspond in these respects—what Eddington calls the metrical aspects of phenomena—with the real external occurrence or fact of nature. But qualitatively, in their inner or intrinsic nature, the two are disparate, and there appears to be no possibility of removing or bridging this disparity. This impossibility need not, however, interfere with the application of science, since the quantitative correspondence is usually sufficient for its purposes. Prediction and control (accepting these as the criteria of science) are possible on the basis of knowledge which is exact and reliable only in so far as it is quantitative. This is exemplified not only in astronomy and physics, but in many departments of biology also.

As already pointed out, when we describe a physical system in quantitative terms, we assume that the characters represented by each numerical unit remain unchanged or invariant during the transformations of the system. That is, the character persists in time and remains the same in different positions of space. A larger character consisting in a summation of smaller unit characters can therefore be

measured, or defined in terms of an invariant standard. What the measured thing is in its inner nature (qualitatively or intrinsically) is not considered in this procedure. The special quality of the thing, its individuality, may be an important or indeed the essential part of its reality, but it is not accessible to science. This is one meaning of the statement that science does not concern itself with values. By thus abstracting from individuality science enlarges the scope of its application; its power of practical control, as seen, for example, in any technical art such as engineering or medicine, depends mainly on this abstract or universal character, which is intimately connected with its quantitative character. Another general reason for the emphasis on quantitative procedure is the experimental observation that only quantitative characters—characters which can be *summed*—such as motions, tensions, or potentials,—are physically effective. This general experience is systematized in the doctrine of energy; the laws of conservation and transformation, strictly quantitative laws, dominate our experience of physical nature. Perpetual motion, for example, is impossible because of the fixed quantitative character of the conditions controlling natural action. Accordingly, all characters which are physically effective are measurable, i.e., are amenable to quantitative treatment. A physical tension or potential (e.g., a force, weight, electrical potential) is measured by opposing a known counter-potential and observing when they balance. Inequalities and equalities are thus established; any action is shown to have an aspect or character in which it is equal to another action. The conception is thus reached that inequality of tension is the primary condition of physical change; conversely, a static condition is a state of equilibrium. Dynamical equations of all kinds contain terms (constants) expressing the invariant characteristics of the potentials (forces or tensions) concerned. Potential or tension thus appears as perhaps the most fundamental fact of nature, and we may infer that it—or something corresponding—is fundamental to reality in general. Apparently the metaphysically real partakes of this character; Bosanquet's dictum, "the Absolute is a tension," may be interpreted in this sense.

Let us return, after this somewhat summary discussion, to the case of vital action. Can it be characterized completely in scientific terms? The foregoing considerations show that it can not, since a scientific description is always partial, selective, and summary in its nature. But a *partial* description that shall be true and adequate so far as it goes *is* possible. What positive results may we hope to gain from a description of the vital process in such terms? And in what important respects is such a description defective or inadequate?

It has already been pointed out that language, logic, and science

alike depend on the recognition of constancies or universals in phenomena. In the scientific description of a phenomenon we may distinguish constancies of two kinds: (1) those referring to the permanent or unchanging properties of the components of the phenomenon in question, and (2) those referring to the permanent modes of action or interaction of these components. For example, we recognize constancies in static chemical properties; all atoms of an element, all molecules of a compound are alike; also constancies in the conditions controlling chemical change, such as reaction-constants, mass-laws, laws of thermodynamics. In brief, quantitative science is based on the assumption of constancies in the entities undergoing change, and constancies in the manner of the change itself. In any particular case the constants assigned represent facts of observation, the direct or indirect results of measurement; hence when we calculate on the basis of constants so determined we expect to get results agreeing with observation. A recognized criterion of scientific validity is agreement between observed and calculated data. Natural fact is said to be understood when it is calculable, i.e., deducible from the constants on the basis of their character and interconnection. All methods of prediction are based on this recognition of constancy in the determining factors of phenomena.

In the matter of creative synthesis, where it is often maintained that the qualitative character of the synthesized product can not be predicted from the character of the components—something essentially novel coming into existence as a result of the conjunction—science observes that a similar rule of constancy applies. The same elements, brought into conjunction in the same manner, yield the same product. In every constructive human undertaking this rule is recognized and acted upon. Constancy of interconnection, i.e., constancy in the relations between the components, is thus as important as constancy in the intrinsic nature of the components.

Science, then, is based on the recognition and precise characterization of the constant features in phenomena. When this is done a large part of our external experience becomes intelligible—satisfactorily predictable and controllable. The biologist aims at finding the same intelligibility in vital phenomena as the physicist finds in physical phenomena. If he seems to have had less success than the physicist in rationalizing his section of nature, we must remember that his enterprise is a more difficult one. But the difference is one of degree. We have already seen that in their inner or ultimately real character all phenomena are unintelligible—beyond complete representation by concepts: there is an arbitrary element in even the simplest detail of nature. In dealing with inorganic phenomena we easily forget this; scientific explanation seems complete; the formu-

lation agrees so closely with the fact of experience that we feel we know all about the phenomenon. With life-processes this is rarely the case; the formula fits the fact less closely. And yet it seems clear that our only hope of understanding—of intellectually formulating—such a natural phenomenon as embryonic development lies in pursuing the methods of exact science. All regular processes are subject to scientific analysis. Ontogeny, while a highly complex process, is a regular one; its course is repeated with exactitude in each individual development; it has its definite uniformities or natural constants which are based upon simpler physical constants. The regular and dependable repetition of the whole complex cycle would obviously be an impossibility apart from the quantitatively definite and controlled character of its details and the definiteness of their interconnection. The precision of vital processes demands physical precision as its basis.

This may be best appreciated by considering first the conditions in the simpler cases of physical change. We then perceive clearly that some constant condition or factor is always present, determining the character and rate of the change. When a stone falls this constant factor is the gravitational constant; when two bodies interact chemically it is the velocity-constant of the reaction (assuming the constancy of other conditions such as concentration and temperature). Even an abrupt and apparently disorderly change like an explosion can be shown to be conditioned by the constant features of the situation: e.g., the heat-modulus of the reaction, the gas laws, the cohesion-constants of the enclosing materials, the general laws of energy. Indeed, it is not too much to say that constancy or invariance in certain controlling factors is a necessary condition in any physical change; evidently without such constancy [4] no change would continue for an appreciable time in one direction. This general condition will remind the philosophical reader of Kant's section on the Principle of Permanence of Substance in the *Critique of Pure Reason;* and it is quite certain that a principle of the same or related kind applies in all physical change. The scientific ideal of defining the conditions of natural processes in exact quantitative terms is in fact a recognition of the part played by constants or permanencies in the behavior of natural realities. The fixity of physical conditions depends on the fixity of still more fundamental conditions, including, no doubt, besides the spatio-temporal, also those general metaphysical conditions known to philosophers as subsistents.

We may now apply these principles to the special case of vital

[4] At least relative constancy; conceivably a condition may itself be subject to change, but this change would itself imply an underlying constancy of conditions, and so on.

action. In any regular life process, such as the development of a living animal from an egg, a similar permanence in the underlying conditions must be assumed, and the task of biological science is to characterize these permanencies exactly. Evidently such a cycle, complex yet exact, would be impossible without a corresponding exactitude in the single component events and their interconnection. Just as a shell fired from a gun describes a curve of constant form—i.e., passes through a cycle of change which is mathematically definable—so an egg released from quiescence by fertilization passes through a constant cycle of change eventuating in the adult animal with its structure and activities complete. The biological sequence, while vastly more complex, resembles the physical sequence in its constancy and determinability. The scientific assumption is simply that an exact specification of the constancies of germ and environment would mean also a specification of the cycle of change which the system passes through, i.e., would enable us to predict the course of development. If exact scientific principle is necessary to describe the simple case, it is all the more necessary in the complex case. Complexity does not in itself introduce irregularity; in fact its very existence presupposes regularity or constancy in the determining processes and conditions. The stable existence of such complex systems as living organisms constitutes, indeed, the clearest and most impressive proof of the constancy (implying scientific determinability) of the conditions underlying organic development.

Similarly, the law-abiding character of the higher vital processes is well shown in any voluntary action, as when one closes one's hand. The greater part of the mechanism lies outside voluntary control. All that we are conscious of is the initiating decision; the rest is carried through automatically. This involves processes of innervation, transmission, coördination, which are extremely complex yet are carried out with precision and constancy. The fulfillment of an intention would be impossible without this constancy in the intermediary physiological processes. When we converse through a telephone we depend on the physical constancy of the instrument; we often forget that we depend equally on the physical constancy of the auditory apparatus and its intricate physiological connections.

What I have just said assigns definite and I think sufficient grounds for accepting the validity of science in its application to living beings as well as to the rest of nature. We may now consider the further question: can any scientific description include *all* that is real about living beings? Obviously, from the nature of scientific procedure, it can not; and it makes no such claim. We must therefore distinguish those fields where scientific method applies from those where it does not apply. What science can do has already been

indicated. Briefly, what science can not do—and what it does not pretend to do—is (1) to portray reality in its completeness and (2) to characterize any single entity or differentiated part of nature as to its special inner reality (intrinsicality) or individuality.

A description of reality in its completeness is an evident impossibility; for one thing, nature is too vast and diversified; the description, to correspond in all detail, would equal the reality. But this is not the essential difficulty, which is theoretical and fundamental, not merely practical. A complete description of a restricted part of nature is equally impossible; each single natural entity or thing has its own special particularity or individual character that can not be described. This follows from the nature of the descriptive process itself; description means specification by concepts; and we have seen that the total reality of a thing can not be represented by concepts. To conceptualize is to abstract from individuality, and each natural entity, besides being a member of a class, is an individual; as individual it has unique characters, qualities, values which are not repeated. Of this individuality science takes no account; its interest is in the general; the individual is of scientific interest only in so far as it is representative of the general, i.e., is typical. We are thus brought face to face with the age-old philosophical problem of the relation of individual and universal.

Let me indicate a little more fully what I mean to express at this point. We have seen that when the mind considers a natural fact it neglects—so far as it is consistent with its purposes—the inner complexity or multiplicity of the phenomenon and subsumes it under a single unifying concept. This is the function of the concept, to unify (take together) or simplify. A synthetic act of the understanding is involved, as Kant perceived: a kind of summarizing process. Any natural event or phenomenon, therefore, is simplified in its mental representation. This is especially true of a vital phenomenon, and *a fortiori* of the scientific representation of such a phenomenon, a scientific description being an endeavor to portray the reality of the phenomenon as economically as possible by means of exact concepts. The rule of parsimony is the guiding principle in scientific description.

Now there is an aspect of this simplification or schematization—always involved in the scientific concepts of nature—which is commonly ignored in scientific procedure, namely, that the differences between the single cases or individuals included under the concept are disregarded. This may be done either unconsciously or with full realization of what is being done. As I have pointed out already, the simplification resulting from concept-making depends on the fact that the data of experience are repeated, a single concept (a type)

standing for many individuals. But each of these has its own unique character or particularity; hence to regard the conceptual symbol as a complete equivalent for any natural entity means that the special individuality of the latter is ignored or disregarded.

Science involves the focussing of attention on those properties, features, and activities in respect to which the units of a natural class are alike or equivalent. When the degree of particularity or individual uniqueness is slight this mode of treatment is usually sufficient for all purposes; we frame a general rule and apply it indifferently to all members of the class. But when, as in the case of many living beings—especially human beings—individualization is highly pronounced, a purely scientific consideration has a correspondingly limited application; and it may be no longer sufficient to characterize what is of chief significance in the being under consideration. The characters of the individual, as individual, then assume primary importance; the class characters, although always present, become of subordinate interest.[5]

We come here to what is perhaps, considered from a broadly philosophical standpoint, the most significant feature of the natural process. Individualization is a feature always present in a natural entity; but it appears to admit of wide gradation in degree. Thus we recognize a certain hierarchy in the classes of natural entities, the units of higher classes being more highly individualized, unique, and autonomous than those of lower classes. All electrons are equivalent, but not all human beings. It would seem that the vital process is peculiar among the processes of nature in that its evolutionary trend is in the direction of more and more complete and distinct individualization. The higher animals especially represent local centres of activity and consciousness, which, although each has its repeated or class characters, are also highly differentiated and unique in their individual characters. This is especially true of human beings. Nowhere else in nature do we find the individual attaining such uniqueness. Accordingly, we find human society constituted mainly by a compromise between the claims of the individual and those of the social group. The class concept of the human being, while indispensable for many practical purposes, proves insufficient when the interests of the individual are considered. Abstractly (as in current democracy) one person may consider himself the equivalent of any other person. Nevertheless his personal individuality or uniqueness is always present in his consciousness; he is aware of his organism as a private centre of experience; and it is impossible—at least without much sophistication—for him to regard himself simply as a class

[5] Compare the recent discussion by J. Needham: "Neo-mechanism, or the Sceptical Biologist," *Hibbert Journal*, 1927, Vol. 27, p. 265.

unit, or as a repeated entity of any kind. His experience contradicts this; consciousness proclaims in unmistakable terms the importance of his individuality, e.g., by making a direct painful protest against the injury of *one* organism (his own), but not of others. This insulation, physically grounded as it is, is nevertheless of central importance in philosophy. It is the condition of personality; the concepts of personality, individuality, and value (in the human sense) are inseparable. The synthesis or emergence of personality in nature, with all that this implies, would thus appear as the outcome of an evolutionary process occurring under physical restrictions of a definite kind. Indeed, it would appear that these restrictions are a necessary condition of individuality.[6]

I have already pointed out that the individual, as such, is not the subject of science. The philosophical view of life, as a process making for more and more complete individualization—such a view as that set forth recently by General Smutz in his book *Holism and Evolution*—is not a scientific view. It is supplementary or additional to the scientific view; but it does not conflict with the latter, and must be regarded, equally with the scientific view, as a true (if partial) statement of certain real and fundamental features of the natural process.

The more unique the individual is, the less do general rules apply —the freer he becomes; i.e., since science is general statement, the less does the scientific method apply. Hence life in its highest manifestations—of individuality and value—is inaccessible to science. Science, however, has its range of application to life for very definite and valid reasons, the chief of these being that the emergence of individuality in living beings presupposes constancy, stability, and generality in the physical conditions, entities, and processes which underlie life and of which life represents a centralized or focalized synthesis.

I find that at the end of my discussion the philosophical and scientific aspects of my subject have become fused and inextricable. I do not believe, however, that more than a provisional separation of science and philosophy is possible. Perhaps we may say that science is the philosophy of the class or type, while ethics and esthetics—the philosophies of value—are the philosophy of the individual. Both are needed for a complete characterization of reality.

RALPH S. LILLIE.

UNIVERSITY OF CHICAGO.

[6] Consider, e.g., space-time as *principium individuationis*.

BOOK REVIEFS

The Misbehaviorists. HARVEY WICKHAM. New York: Lincoln MacVeagh. The Dial Press. 1928. 294 pp.

It seems that there has been a conspiracy afoot in the Republic, a "gigantic piece of mystification" which has been perpetrated by a "small but very influential body of conspicuous persons who may be described as Materialistic Philosophers." That they are "very influential" is shown by the fact that their books circulate "by the hundreds of thousands" quite without any interference from that Inquisition which one feels that Mr. Wickham, in the indignation of his heart, would be only too glad to restore if he could. Failing that, he sounds the tocsin of alarm (rather expensively, it seems) for those pious persons described by him in his dedication as "disturbed by the apparent logic in many current theories hostile to their dearest convictions."

To get at the real logic of this violent tirade against the enemies of the faith, it is necessary only to perceive that the "gigantic piece of mystification," now christened Misbehaviorism, is at the same time composed of some of "the most preposterous attempts at hocus-pocus ever recorded in the history of the human race," calculated to deceive no one with the critical powers of a child of ten; and yet the hundreds of thousands of readers, including many pious folk, are completely taken in by its "apparent logic." There can be but one conclusion, namely, that some of Mr. Wickham's intended clients are not quite bright. On page 251 he is logical enough to arrive at it. "There are," he says, speaking of the popularity of Browne's *This Believing World,* "in this Republic a large number of people incapable of being troubled by equivocations, by the glaring inconsistencies of flatly contradictory statements living at seeming peace in the midst of the same argument, or people incapable of remembering or too careless to remember more than one statement at a time." It is by this audience that Mr. Wickham's book will also be most enthusiastically received. For in accusing the Misbehaviorists of almost every crime on the logical calendar, there is hardly a fallacy which he does not commit himself.

The names of the conspiring Materialistic Philosophers will come as a surprise both to materialists and to philosophers. They are Messrs. Watson, McDougall, Freud, and Wiggam (with the rank and allowances of major Misbehaviorists) and Messrs. Dorsey, Browne, and Durant (who are vouchsafed only minor recognition, for reasons which are equally obscure). Politics, it appears, is not the only maker of strange bedfellows. The author grants that "superficially considered, Freud is the very antithesis of Watson. The behaviorist, indeed, will have none of him . . . accuses him of having 'resorted

to voodooism instead of falling back upon his early scientific training.' Nevertheless, Watsonianism and Freudianism are parts of the same gigantic piece of mystification." The key to the Freud-Watson *entente hostile* may be found in Mr. Wickham's classification of doctrines by their alleged effects upon certain religious beliefs, particularly upon his pet conviction in favor of undiluted Free Will. It matters not to him that his enemies revile each other occasionally, or that genunine materialists denounce some of them as unmitigated idealists. He will not be denied a single target for his journalistic invective. Whoever, in his judgment, causes uncritically-minded folk to cease to believe ardently, along with all "right-thinking" and "clear-headed scientists, philosophers and mathematicians," in a potent "veritable Psyche" and an omnipotent God, is a Misbehaviorist, a Mechanist, and a Materialistic Philosopher.

With all the fervor and freedom from bias which might be expected of a Jesuit polemist, the author drags out the ancient charges against the "pseudo-science" of his victims, most of whom have long been accustomed to places in the Fundamentalist pillory. No sentence of theirs is too trivial or indecent, no ridicule or innuendo is too cheap to find a place in this psychological *Mother India.* Mis-translations, sentences wrenched out of context, third-hand sources and fourth-hand authorities are woven solemnly into this Wickham Against the Bugaboos, a work which might have been written by an inverted Upton Sinclair. A few samples will more than suffice. "In order to be perfectly fair [to Freud]," says the humorless Mr. Wickham on page 90, "I shall confine myself almost exclusively to the analysis of a single book . . . *The Interpretation of Dreams,* using the third edition of the authoritative English translation of A. A. Brill." Wishing to annihilate Watson on synapsial resistance, the author "calls to the stand" Professor C. H. Warren by citing an article in this JOURNAL, Volume XIII ("It chances that I have access to certain passages from this paper," he says mysteriously) without informing his readers that it appeared in 1916, whereas some of the doctrines in question are of the vintage of 1927. Mr. Wickham is "tempted to enquire into Durant's own environment, his college, his religious and philosophical surroundings," but evidently resists the temptation, since he belabors Durant for his remarks concerning "this Scholasticism which he seems not to have read"; when the facts are that Durant's whole early training was Scholastic.

The real hero of the book, however, who "tears to bits in a single article" the dictum of Freud on determinism, is Ralph S. Lillie of the Marine Biological Laboratory, who announces what is "much more thrilling than the most incestuous dreams ever dreamed by a Freudian, or all the discoveries ever made by dropping babies upon

pillows in the laboratories of Dr. Watson," namely, "that we are free." Why? Because quantum phenomena are unpredictable, a conclusion arrived at by methods of abstraction which Mr. Wickham has savagely denounced a few pages earlier. But Mr. Lillie is a "good" scientist, so the author exultingly concludes: "We are so built that the minutest imaginable interior events may determine our largest actions." Atoms, being individuals, "behave capriciously, obeying the laws of their unique natures, laws known only to God." They turn up merely statistical regularities of behavior of our physical bodies, and, at the same time, apparently, steer us about capriciously by Divine Command. For the author is no Monist. "Matter remains matter," he tells us. "The ultimate knot cannot be untied. The seamless veil has been drawn too tightly across the face of Deity for it ever to be penetrated by physical science." So even the services of the excellent Mr. Lillie seem to be dispensable.

All this is not for a moment to acquit the Misbehaviorists of their follies, which are notorious, and which have been exposed on dozens of occasions by minds infinitely more competent and judicial than Mr. Wickham's. As one who has been pained again and again by passages in the writings of every one of the authors under fire, and even more so by almost the entire present volume, the reviewer finds it difficult to enter the fray on either side. One is strongly tempted to indulge in a certain sardonic satisfaction at such a perfect journalistic dog-eat-dog spectacle as Wickham *versus* Wiggam, for example. But while all parties concerned have sinned grievously against logic, against impartiality, and even against the decencies of civilized debate, not all the culprits are equally guilty. Freud, Watson, and McDougall have at least rendered past services to science which entitle them to segregation from the popularizers of the moment. And yet, while no enemy could wish them a more unjust abusing than they receive in *The Misbehaviorists,* no friend can deny that they have brought it upon themselves. Meanwhile let the pious pray for protection against such friends as Mr. Wickham!

HAROLD A. LARRABEE.

UNION COLLEGE.

Opera hactenus inedita Rogeri Baconi: Fasciculus VI. Compotus Fratris Rogeri, accedunt Compotus Roberti Grossecapitis, Lincolniensis Episcopi, Massa Compoti Alexandri de Villa Dei. Nunc primum edidit ROBERT STEELE. Oxford: Clarendon Press, New York: Oxford University Press, American Branch, 1926. xxvii + 302 pp.

Opera hactenus inedita Rogeri Baconi: Fasciculus VII. Questiones supra Undecimum Prime Philosophie Aristotelis primae et secundae. Nunc primum edidit ROBERT STEELE, collaborante

F. M. Delorme, O.F.M. Oxford: Clarendon Press. New York: Oxford University Press, American Branch, 1926. xii + 160 pp.

Not a few of the problems which have arisen in the study of medieval philosophy will be impossible of solution until the task of editing the texts of the period has been advanced further. Mr. Steele's contribution to the knowledge of Roger Bacon is particularly crucial since critical work on the doctrine of Bacon must be halted at present before the rumor of Bacon manuscripts scattered through the libraries of Europe. Mr. Steele has reached the seventh fascicule of his attempt to set the reported manuscripts in printed form.

The sixth fascicule contains the *Compotus* of Roger Bacon; it is the statement of the full detail of his attempt to solve the faults of the calendar. The evils, as well as the reforms suggested here, are touched on in both the *Opus Majus* and the *Opus Tertium,* but with rather less astronomical precision and rather more insistence on religious consequences: on the doubts concerning the day of the Passion, the celebration of Easter, and the dating of the Christian era. But even with that consideration, it is a little surprising, since Mr. Steele places the date of this treatise earlier than that of the longer works, that no mention of it occurs in them. Mr. Steele meets this objection only in part by his insistence on the lost works, the *De Termino Paschali* and the *De Temporibus a Christo,* which probably treated the subjects taken up in the *Opus Majus* and the *Opus Tertium,* and may therefore have quoted them. But the hortatory tone of the *Opus Majus,* then, urging the undertaking of a work which the author had himself completed very efficiently three years earlier, must (doubtless) be considered a device to arouse the interest of the Pope. It is difficult otherwise to explain, "Potest igitur Vestra Reverentia jubere, et invenietis homines qui præclara remedia apponent in hac parte; et non solum in prædictis, sed in totius calendarii defectibus. Nam tredecim sunt radicales, et habent ramos quasi infinitos. Si igitur istud opus gloriosum fieret in temporibus Vestræ Sanctitatis, tunc una de majoribus rebus et melioribus et pulchrioribus consummaretur quae unquam in ecclesia Dei fuerunt attentatæ." There seems, however, no sufficient ground in this for supposing the work is not Bacon's; but from whosever hands it is, the influence of this work on the calculations of Peter d'Ailly, Nicholas of Cusa, Paul of Middelburg, and thence on the reforms associated with the name of Gregory XIII instead of that of Clement IV, is extremely great. The inclusion in this fascicule of the works of Robert Grosseteste and of Alexander de Villa Dei makes available other important contributions in the history of calendar reform.

In two of the works contained in the sixth fascicule Mr. Steele makes no attempt to establish a critical text, contenting himself with reproducing the best and earliest manuscript. In the Questions on the Eleventh Book (our Book Λ) of the First Philosophy of Aristotle printed in the seventh fascicule, no such choice, unfortunately, was possible. The work is part of a unique manuscript, probably of the fourteenth century, which contains in addition to the two series of questions published here two series on the Physics and two more on the Metaphysics. The manuscript, moreover, is a difficult one: the editor protests that usually the abbreviations of the first series of questions can be expanded in two or more different ways, that the abbreviation of *absolute* may be taken for that of *abstracte, causata* for *creata,* and that there are gaps in the argument from time to time. The reconstructions that have been necessary seem often to have been made more with a view to syntax than to Aristotelian philosophy, though in some passages it would be difficult to justify the text on either ground. Mr. Steele promises a later fascicule in which the text of Aristotle's work which was used by Bacon will be examined more fully, and doubtless it will be possible there to include some appropriate notes and emendations to passages in this commentary which in their present form make little sense. His procedure, however, in thus dividing his work is commendable, since between the interminable delays of a critical text and the faults of a promptly issued one, the corrections and reconsiderations of the latter are preferable.

An edition of the Questions on the Physics contained in the manuscript is promised; with it the history of Aristotelianism will be surer in one more step. But no mention is made in the Preface of the *De Plantis* which Cousin and Duhem both report in this manuscript. Nor is the question of authenticity touched on; Duhem thinks the commentary on the Eleventh Book is probably, but not certainly, Bacon's, and he points out that whereas the other series on the Metaphysics is always attributed specifically to Bacon (as e.g., 2 pecia supra secundum metaphisice R. b.), this is entitled only *de XI libro.* Moreover, Mr. Steele makes no statement concerning that other series of questions on the Metaphysics (Cousin lists commentaries on the first, second, fifth, sixth, seventh, eighth and ninth Books); but it is to be hoped that he will find the opportunity to issue them in the near future. The report of Victor Cousin on this manuscript in the *Journal des Savants* in 1848, it is interesting to note, closes with the hope that a "young and conscientious amateur of the philosophy of the middle ages" would subject it to a detailed study; the work has waited almost eighty years for the hope to be realized in part by the edition of one section of it.

RICHARD MCKEON.

The Gospel for Asia, A Study of Three Religious Masterpieces: Gita, Lotus, and Fourth Gospel. KENNETH SAUNDERS. New York: The MacMillan Company. 1928. Pp. xv + 209, with appendices and index.

The Bhagavad Gita, the Lotus Scripture, and the Fourth Gospel are classics respectively of Hinduism, Buddhism (especially Japanese Buddhism), and Hellenistic Christianity. It would seem impossible, at first thought, to select three more divergent religious tendencies. If, in spite of this, the works in which these religious movements find their supreme expression prove to be astonishingly similar in their fundamental teachings, that is not merely an interesting fact for students of Comparative Religion; it is a psychological fact of the widest generality and of the utmost significance for any understanding of human nature or religious aspiration.

Just such a resemblance Professor Saunders exhibits.

"All three belong to great periods in the springtide of the Spirit, when creative personalities had called forth a response of devotion and gratitude. They are all works of mystical worship of a loving Savior, who reveals the mystery of his infinite compassion in discourses of surpassing power and charm. . . . They are Scriptures of incarnation. . . . For all of them this is the Eternal speaking in time; and they all realize that a great Idea must tabernacle in human flesh to have redemptive power" [p. ix].

The work under consideration, then, may be described as a comparative study of the Incarnation Idea in three of the great religions of humanity. As a study in the psychology of religion it seems to me that it is entitled to a wide reading. Mere exposition, however, is only a small part of the author's purpose. He seeks to make apparent to orthodox Christians the world-wide relationships and significance of their central doctrine, to commend the Christian gospel to those of other faiths, and to lay a foundation, of mutual understanding and appreciation, for a universal spiritual culture. It is an interesting suggestion that a "League of Religions against the common foe, materialism, would do much to reassure humanity and to serve the cause of the God of light and love" (p. xii).

It is a far cry from old-time missionary propaganda to such a paragraph as this, which well represents the author's attitude throughout his work:

"Seen thus, the Gita and the Lotus need not be considered as rivals of the Fourth Gospel, but as forerunners leading men to it as the supreme and satisfying statement of an ideal toward which they have striven with heroic faith and brilliant vision. It is a work which tells their devotees, as it told the cultured world of Greece, 'God *is* what you are sure He ought to be; He is gracious as Krishna,

compassionate as Sakyamuni. He has broken the bonds of Karma and Samsara which you resent, yet are forced to accept. Your Scriptures are a cry for life, and here is Life indeed. They are a demand that men be free as sons in a universe ruled by a Father, and here is the Truth, the Unique Son and express image of the Father' " [p. 30].

After an introductory chapter there follow nine which it is probably best to list as they appear in the Table of Contents.

II. The Historic Founders—Krishna, Sakyamuni, Jesus.
III. The Environment of the Three Books and their Aims.
IV. The Eternal Order: Logos, Brahman (Pantheism), Dharma (Impersonal Law).
V. The Architecture and Analysis of the Books.
VI. The Goal in the Three Books.
VII. Their Ethical Heritage.
VIII. Their Ethical Teachings.
IX. Their Doctrinal Heritage and Teaching.
X. Conclusion.

It is obvious that the author covers an immense field and that it is impossible for a review to do more than mention a few points of particular interest. For myself the most interesting portion was the description of the Ephesian background of the Fourth Chapel. (It would apply about as well to Alexandria, if one should be inclined to insist upon an Egyptian origin of the Gospel.) The official religion, the impressive mystery religions, the philosophies of the day, the growing church, the Gnostic and other incipient heresies, are briefly but vividly sketched. The reader fairly feels the extraordinary psychological atmosphere. Referred to its setting, and read in the light of its purpose, the familiar Christian classic must gain for many an utterly new significance and value.

"To all alike, Christians, Jews, Stoics, Greeks, and Asiatics, he offers the universal gospel of the Christ. . . . Seekers after life, they were to be given life more abundant. . . . Seekers after truth, they were to find that truth itself had dwelt among men. . . . To the intellectualist Greek He was to be revealed as a potent act of God, whom to 'know' was life indeed. . . . To the followers of the mystery religions here was the Savior from sin, the Life-giver whom they had sought; and to pagan and Jew alike here was the Father manifested in His only Son. Here for the Gnostic was a true Gnosis. . . . To the Docetist here was vindication alike of the humanity of Jesus and of his oneness with God" [p. 65].

Since all three works teach the doctrine of a divine incarnation, why should we prefer any one to the others? To this question Professor Saunders devotes his final chapter. It is impossible in a brief review to do justice to the real eloquence with which he urges his

views or the many arresting and challenging suggestions he throws out. The following quotation, perhaps, summarizes his position as well as it can be done within such compass.

"In what, then, does the originality and in what does the finality of the Christian religion consist? It is original, not primarily because it teaches things which the others do not teach—Sakyamuni and Laotze taught a very Christ-like gospel of love, including the Golden Rule, six centuries before Christ—but in the fact that it sums up these, and gives perfect and poignant expression to processes that are operative everywhere, and to truths that are eternal; and that it incarnates in them a Person of matchless strength and beauty. Jesus says more simply and more arrestingly many things that others tried to say before Him, and gives a new harmony and poise to them. And He alone fully embodies His teachings" (p. 186).

But what is the relation between this "Person" and the historic Jesus of Nazareth and Galilee? On this point Professor Saunders seems to me far from clear. We need not be surprised, he tells us, to find the author of the Gospel "dramatizing some great idea by describing an incident which is no more real history—yet more really true—than the meeting of Krishna and Arjuna, or than the Eternal Sakyamuni on the Heavenly Vulture Peak of the Lotus" (p. 12). To leave the matter there, seems to me a serious weakness in an interesting and stimulating work. The questions arise and will not down, why a Palestinian incarnation should be more credible than an Indian one and whether the Incarnation Idea itself can have any but a historic and psychological interest for persons of our time.

WILLIAM H. ROBERTS.

THE UNIVERSITY OF REDLANDS.

Some Aspects of the Philosophy of L. T. Hobhouse, Logic and Social Theory. J. A. NICHOLSON. (University of Illinois Studies in the Social Sciences.) Urbana: The University of Illinois. 1928. Pp. 82.

This study is a well-articulated criticism of the contributions of Professor L. T. Hobhouse to social and philosophical thought. The five chapters rapidly and lucidly sum up the reaction of this important English thinker against the idealistic tradition, his development of a realistic theory of knowledge, his emphasis on reason, and his contributions to the literature of sociology and politics. The author has a clear understanding of the factors involved in both the rise and the decline of Hegelianism in England, and of the part Hobhouse has played by his reinterpretation of the Bentham-Mill tradition. For, although the influence of Bosanquet on the development of his "organic" view of reason is acknowledged by Hobhouse, there is no

doubt that the decay of idealism has been furthered by his work. He has given the native English tradition an evolutionary and scientific statement which is far superior to the facile and doctrinaire optimism of Herbert Spencer.

In the final chapter the author suggests the fact that Hobhouse is a mediator between the two traditions in England rather than a protagonist of either. This point is well taken. The utterances of Hobhouse since *The Metaphysical Theory of the State* (1918) indicate a drift toward the idealism which he criticized so severely. "Consilience," "harmony," "unity," "organic," are terms which suggest that he is not immune to monistic metaphysics. Yet the abstractions of Hobhouse always possess a thickness, a filling, which the formalisms of orthodox idealism lack. "Mind" in the work of Hobhouse suggests the νοῦς of Aristotle rather than the static Absolute. His doctrine is therefore the more believable.

Dr. Nicholson's study renders a real service. I know of no better secondary source concerned with the philosophy of Professor Hobhouse, a philosophy of which students in this country hear too little.

PAUL W. WARD.

JOURNALS AND NEW BOOKS

JOURNAL OF PHILOSOPHICAL STUDIES. Vol. III, No. 12. Value: Primarily a Psychological Conception: *M. W. Calkins.* The Confusion of the Concept: *William McDougall.* The Marriage of Universals (II): *G. R. G. Mure.* Ethics, Psychology, and Sociology: *A. E. Garvie,* A Century of Philosophy at University College, London: *G. Dawes Hicks.* The Philosophy of Social Life: *C. Delisle Burns.* The Non-Existence of Matter: *C. E. M. Joad.*

REVUE D'HISTOIRE DE LA PHILOSOPHIE. 2e Année, Fasc. 4. Scolastique musulmane et scolastique chrétienne (suite et fin): *L. Gauthier.* La finalité chez Descartes: *Jean Laporte.*

THE NEW SCHOLASTICISM. Vol. II, No. 4. Some Thoughts on Professor Dewey: *Virgil Michel. Assimilari Deo: E. A. Pace.* The Theory of Fallacy in Aristotle and Kant: *F. A. Walsh.* Chronicle—Cerebral Localization of Psychic Functions—An Historical and Critical Survey (I): *John Haldi.*

ZEITSCHRIFT FÜR PSYCHOLOGIE. Bd. 108, Heft 1 u. 2. Ueber Methoden der psychologischen Typenforschung: *E. Jaensch.* Zur näheren Analyse der Wahrnehmungswelt des integrierten Typus: *Käthe Warnecke.* Vergleichende Untersuchungen über das Aubertsche Phänomen: *Itzen Kuo.* Beiträge zur Psychologie der Raumwahrnehmung und räumlichen Vorstellung: *Heinrich Schole.*

Neue Versuche mit der Galtonschen Typenphotographie: *Hans Friesenhahn.*

SCIENTIA. Vol. XLIV, N. CXCVIII–10. The Empirical Basis of the Theory of Errors: *L. R. D. Weld.* Ueber die Quelle der Sonnenstrahlung: *E. Freundlich.* Coordinazione chimica e coordinazione nervosa: *U. Lombroso.* La notion de la neutralité et la Société des Nations: *N. Politis.*

BULLETIN DE L'INSTITUT GENERAL PSYCHOLOGIQUE, 1928, Nos. 1–3. Recherches sur l'ancienneté et l'évolution d'anciennes chansons populaires françaises de tradition orale: *P. Coirault.*

Borries, Kurt: Kant als Politiker. Zur Staats- und Gesellschaftslehre des Kritizismus. Leipzig: Felix Meiner. 1928. vi + 248 pp. 10 r.m.

Grabmann, Martin: Thomas Aquinas. His Personality and Thought. Authorized Translation by Virgil Michel. New York: Longmans, Green & Co. 1928. ix + 191 pp. $2.50.

Hughes, Percy: An Introduction to Psychology. From the Standpoint of Life-Career. Bethlehem, Pa.: Lehigh University Supply Bureau. Second Experimental Edition. 1928. 214 pp.

Joël, Karl: Wandlungen der Weltanschauung. Eine Philosophiegeschichte als Geschichtsphilosophie. Third installment, pp. 321–480, of Volume I. Tübingen: J. C. B. Mohr (Paul Sieback). 1928.

Naumburg, Margaret: The Child and the World. Dialogues in Modern Education. New York: Harcourt, Brace & Co. 1928. xxiv + 328 pp.

Démocrite: Doctrines Philosophiques et Réflexions Morales. Traduites et précedées d'une Introduction par Maurice Solovine. Paris: Félix Alcan. 1928. xlviii + 170 pp. 15 fr.

Warrain, Francis: Quantité, Infini, Continu. Paris: Félix Alcan. 1928. 194 pp. 20 fr.

NOTES AND NEWS

The International Congress of Applied Psychology, which it was announced would take place in Paris in October of this year, has been postponed, and will be held in Paris, March 21 to 27, 1929. For information, address M. Paul Masson-Oursel, 35 rue Boissy d'Anglas, Paris VIII, France.

The Department of Philosophy of the University of California at Los Angeles announced the following appointments: F. C. S. Schiller of Corpus Christi College, Oxford, as visiting professor for the second half of the present year, and John E. Boodin as a Professor in the department.